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54. Calender for thermo-adhesion.

72. Invention of:

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The invention relates to a calender for thermo-adhesion, counter-adhesion, thermo-bonding or thermo-impression of any medium in woven or non-woven textiles, plastic material, etc.

This type of apparatus is generally used when it is a matter of assembling two textile materials, one of which is provided with dots or a net of glue. These operations intervene, for example, in the bonding of tailor canvas on a fabric suitable for making clothes, and the linings of clothes to increase the firmness of a knit weave or jersey.

The devices known until now are provided with a single drum heated to a temperature of 150°C to 200°C. The operation takes place by making the two strips of material pass between the drum and a single continuous belt enveloping the major part of the drum. These devices of high output and efficiency as far as the operation of adhesion, bonding or impression, nevertheless present a certain number of disadvantages as far as the presentation of the product and the speed of treatment. The fabric so doubled has a strong tendency to take a curved form on exit.

Another big inconvenience of these devices with a single drum and a single belt lies in the fact that only one of the two strips, that turned toward the drum, is directly in contact with the source of heat. The second strip being poorly heated, the adhesive penetrates it poorly.

The objective of the present invention is to compensate for these inconveniences by proposing a better-constructed calender for thermo-adhesion, counter-adhesion, thermo-bonding or therm - impression, so that the product no longer has this tendency t take a curved form.

Another objective of the invention is to facilitate the penetration of the adhesive by triggering the heating of the external second strip by using the heat accumulated by the first belt laid against the first drum, and which will reach the position of outer belt at the time of rotation around the second drum.

The calender according to the present invention is characterized in that it is composed of at least two drums with parallel axles turning freely, heated on the interior to a suitable temperature by any means of heat, and two continuous belts passing over these two drums and enveloping them on the major part of their circumference, these belts serving to lay one on the other two strips of material with a view to being subjected to treatment while they are conveyed between these continuous belts.

The device according to the present invention, in relati n to similar arrangements known today, has the principal advantage of not elaborating a product which has a tendency to curve. The product thus obtained is perfectly flat.

The presence of two heated drums and a much longer route over the heating zone permits a much higher speed of travel, around 400 meters per hour. The device also permits heating front and back of a material carrying the adhesive, the two sides being in the same state of treatment, at contact with a belt. Thus the adhesive penetrates better, the thermo-united whole emerging flat from the installation.

A progressive pinching effect is visible at the entrance of the first heating drum because of the presence of the two continuous belts. This effect can be further improved by the attachment of a floating roller laid on one of the two belts.

This effect of progressive pinching avoids a direct crushing of the fabrics, as well as a possible repelling of one of the two strips.

The heat transmission is facilitated by the use of very fine belts in siliconized canvas, which exhibit in addition an anti-adherence character avoiding sticking due to smears of glue.

The apparatus allows the attachment of a spraying device and a vaporization ramp at the entrance, and a conveyor, a refrigeration device, or another closely-related device, at the exit.

The invention will be easily understood according to the description of a form of execution and the attached drawing, which is a schematic view of the whole of the installation according to the present invention.

The calender for thermo-impression according to the invention and the attached drawing is comprised of at least two drums 1 and 2 with parallel axles turning freely. These drums are heated inside to a suitable temperature. The means of heating are very different according to local possibilities: among others steam heat, oil bath, electrical resistance, thermal fluid, gas, etc. can be used. The relevant devices are well known.

Two continuous belts 3 and 4 or "messengers" go over drums 1 and 2, enveloping them on the major part of their circumference, in forming an S. These two continuous belts 3 and 4 serve t lay one on the other the two strips f a material set up, for example, for thermo-impression, by a support and a special paper. These two strips enter the machine by the entrance 5, following the direction of arrows. They are taken between the two

continuous belts 3 and 4 and conducted to the exit 6 of the machine where the product also follows the direction of the arrows. The two strips of material are thus pressed during the whole length of the operation.

The continuous belts 3 and 4, after having gone over the heating drums 1 and 2, are returned by detour cylinders 8. For each belt one can also provide a regulating and driving cylinder and a tension cylinder 9 with sliding bearings controlled by jacks, following devices already known.

The linear speed of the two belts is identical. One can provide for either two belts activated by a motor, or, preferably, one of the belts activated by a motor and the other driven by friction.

An effect of progressive pinching is produced at the entrance of the first heating drum 2. Following a preferred form of execution of the invention, a floating roller 7 is laid on the continuous belt 3 or 4 in order to increase this effect.

Note that in the method of execution presented, the belt closest to drum 2 is heated in traversing it by transmission f heat from belt 3. The belt which was inner in traversing drum 2 becomes outer in reaching drum 1. The other belt is thus heated by drum 1 by means of belt 4. Drums 1 and 2 being fairly close, and the speed of progress being important, one realizes that during the start of the route on drum 1 the two belts are heated simultaneously.

The belts provided for thermo-adhesion are fine, in siliconized canvas, to facilitated the transmission of heat, and exhibit anti-adhesion character in order to avoid sticking due ... smears of glue.

The feeding device can be an inclined plane 11. Likewise, a spraying device 10 and a vaporization ramp can be placed at entrance 5 in order to humidify the fabric before treatment.

One can also provide for a conveyor at the exit 6 of the machine, either independent or composed of a part of belt 3 r a table of sequential descent, and possibly a refrigeration device.

Placing the whole ensemble in an oven or in a heated room can also be considered.

Following the physico-chemical properties of the adhesive carried by one of the materials, it has also been ascertained that it could be advantageous to exert a pressure on the two materials while still warm, allowing a better adhesion to be obtained.

A method of application of this pressure is shown schematically in figure 2. This device allows the configurati n of the adhesive dots in fusion which come out of drum 1 to be transformed in a generally conical form. To improve adhesion, the crushing of these cones is triggered in order to make the adhesive better penetrate the material which was virgin at origin. It is therefore understood that this pressure must be exercised at the moment when the adhesive, which has reached its fusion point, begins to cool. The pressure time, variable according to the adhesive used, will be slightly higher than the time necessary to pass from the point of fusion to the point of hardening of the adhesive. Natural cooling or another means could also be used, such as a cooled cylinder applied to one of the materials. A device capable of applying an adjustable pressure according to the materials and adhesive used can also be provided for.

The device shown schematically in fig. 2, allowing this pressure to be obtained, is placed immediately at the exit of the drums 1 on one part and the continuous belts 3 and 4 on the ther part, between which the two strips of material to be glued circulate. A principal cylinder 12, mobile in rotation in the direction of arrow 13 around its axle 14, is placed under belt 3. This cylinder can take several positions so as to be adjustable in height in relation to belt 3. It can possibly be cooled by any known means in a zone where it is not in contact with the belt. On the upper part of belt 4 two cylinders 15 and 16 are arranged, driving a belt 17 in the direction of arrow 18. This belt is tightened by known methods between the two cylinders 15 and 16 which are separated one from the other.

Belt 17 and cylinder 13 imprint on belts 3 and 4 a force of pressure perpendicular to their surface on an arc of circle 19 . The pressure is thus uniform on all points of the arc of the circle.

In 20, at the exit of this pressure device, the adhesive has reached a temperature below its hardening point. For example: at the exit of drum 1 the adhesive is around 180°, whereas in 20 it is around 140°. A air drive device 21 then allows the material to be brought to the surrounding temperature.

Although the invention might have been described relevant t a particular method of execution, it also covers the changes of form and combinations of these different elements which could occur without diverging from its sense.

CLAIMS

1 - Calender for thermo-adhesion, counter-adhesion, thermo-bonding or thermo-compression of any support in woven or non-woven textile, plastic material, leather etc. characterized in that it consists of at least two drums 1 and 2 with parallel axles turning freely, heated inside to a suitable temperature by any means and heating device, and two continuous belts 3 and 4 going over these two drums and enveloping them on the major part of their circumference, these belts serving to lay two strips of material one over the other with a view to undergoing a treatment while they are conveyed between the said continuous belts 3 and 4.

2 - Calender according to claim 1, characterized in that the two continuous belts 3 and 4 are driven by a motor.

3 - Calender according to claim 1 characterized in that any one of the continuous belts 3 and 4 is driven by a motor while the other is driven by friction.

4 - Calender according to any one of claims 1 to 3 characterized in that it is provided, after the entrance 5 of the machine, with a floating roller 7 laid on any one of continuous belts 3 or 4 in order to increase the pinching effect.

5 - Calender according to any one of claims 1 to 4 characterized in that the continuous belts 3 and 4 are returned by detour cylinder 8 and that they are also provided with adjusting and driving cylinders just as with tension cylinders 9.

6 - Calender according to any one of claims 1 to 5 characterized in that it is provided, before the entrance 5 the machine, with a spraying device 10 and/or with a vaporizati n ramp to humidity the fabric and at the exit 6 of the machine with transport devices and other treatment accessories.

7 - Calender for thermo-adhesion according to claim 1 characterized by the fact that it consists of two turning drums with parallel axles, two continuous belts independently enveloping the drums in the form of an S in order that the internal belt in relation to the first drum becomes external in relation to the second drum.

8 - Calender following any one of the preceding claims characterized by the fact that it exhibits at its entrance an inclined work plane in the direction of the two belts progressively approaching each other and placing into c ntact the two strips of material by pinching before entrance f the first drum.

9 - Calender following claim 1 characterized by the fact that it exhibits in the proximity of the exit of the second drum a device destined to apply, on one part of the length of the tw strips, a force of pressure during a time corresponding to the passage of the adhesive from its fusion point to its hardening point.

10 - Calender according to any one of the preceding claims characterized by the fact that the pressure device is composed f a cylinder, possibly cooled, mobile in rotation in the proximity of one of the belts, said cylinder giving to the two belts a form in the arc of a circle on a portion of their length, and in which a secondary belt takes the two belts in a sandwich form with the cylinder.

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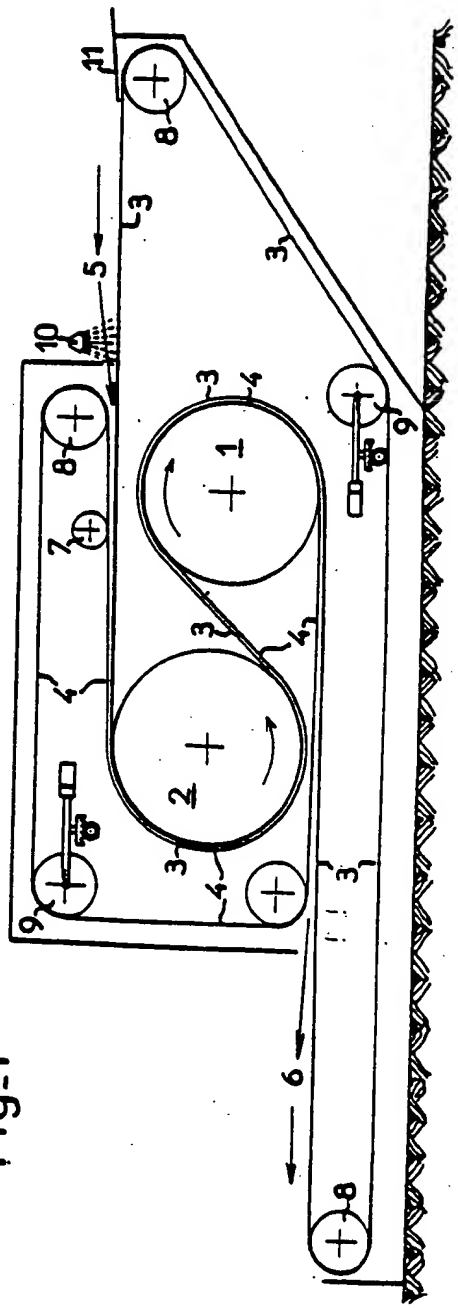

Fig-1

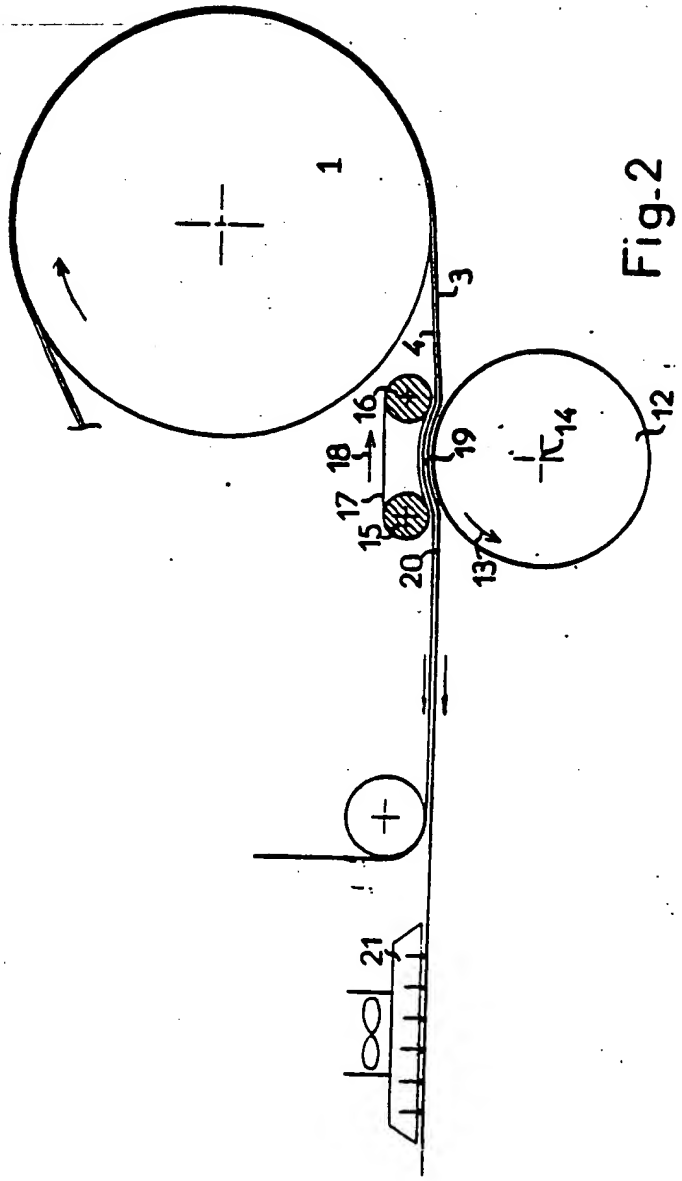

Fig-2